Academic Business Plan for the MS and PhD Program in Pharmaceutical Sciences, School of Pharmacy and Pharmaceutical Sciences, Binghamton University.

Overview

extramural research funding to SOPPS is $2.3 M in its 3rd year of operation, including two projects in a NIH U54 pediatric pharmacology center. The grant portfolio of our faculty members is significantly increasing. At the beginning of 2020, Pharmaceutical Sciences faculty members received 3 new NIH awards (2 R15 awards and 1 K99/R00 award) and two new grants from private foundations. The proposed MS and PhD programs will take advantage of these pre-existing structural, financial, and human resources within the School, and will leverage the existing and well-established classrooms and research facilities that are equipped with state-of-the-art instruments that will also support the proposed graduate research programs. These are interdisciplinary MS and PhD programs with strong research and resource capabilities, where students can learn from different laboratories and faculty members without boundaries. Students will also leverage expertise of other faculty across different departments within the School and across campus. The School currently employs 14 clinical practice faculty and 3 additional faculty from the Heath Outcomes & Administrative Sciences department. Faculty from all 3 departments participate in ongoing collaborative research projects (e.g., Lyme disease research, health outcome measures, and bioinformatics) within the School.

It is pertinent to note that MS and PhD programs can be initiated without requiring any new infrastructure. The Graduate program director, faculty members of the Pharmaceutical Sciences department, the 1.7 departmental laboratory staff as well as the Administrative Assistant for Pharmaceutical Sciences are **fully paid** by the School and are committed to contribute to instructional efforts and administrative oversight of the proposed program. The proposed program will also take advantage of the existing faculty members and the two new tenure-track faculty lines that are **already allocated to SOPPS** in the business plan to deliver the PharmD program. That is**, no funding for faculty lines (two to-be-hired or existing) is requested to deliver the proposed MS and PhD programs**.

Benefits *statement that details what the sponsoring unit and the University will gain from the establishment of the program or facility. It is essential that a clear connection be drawn between the new development and the existing mission and goals of the unit and that the associated improvements in program be examined. It should also be made clear how the program or facility relates to the mission and the strategic plan of the University. Since this is an academic plan, it will be necessary to address separately the aspects of education, research, and service.*

premier public university dedicated to enriching the lives of people in the state, region, nation, and world through discovery and education and to be enriched by partnerships in those

clearly seen in the healthcare field, as both education and research provide a widely recognized

Pharmacy and Pharmaceutical Sciences (SOPPS) and, specifically, the NYS Department of Education registration of the Doctor of Pharmacy (PharmD) program, is a significant step towards accomplishing these goals.

-be- the Department of Pharmaceutical Sciences. Statistical course will be delivered by an existing faculty from the Department of Health Outcome & Administrative Sciences.

Research: Faculty members who will be running the MS and PhD program in Pharmaceutical Sciences are engaged in research activities spanning from basic to clinical and translational research. More specifically, we have 3 faculty working in cancer therapeutic target development and drug testing, 4 faculty working in muscular dystrophy pre-clinical and clinical studies including biomarker development, two faculty working in drug design and drug delivery, and one faculty working in development of bioinformatics for biomarker studies. Faculty members from the School of Pharmacy have developed strong collaborations with other departments across campus and regionally. Several faculty are active members of recently established tick-borne illness center in collaboration with the Department of Anthropology at Binghamton University and Cornell University College of Veterinary Medicine. Grant awards to date have totaled in excess of $4.2 million, demonstrating that we have excellent resources to support high-quality MS and PhD programs.

Services: The proposed programs are expected to provide both academic and community services. Several of our faculty are already serving on a number of committees across campus, including IACUC, UPC, Faculty Senate, Graduate Committee, and Transdisciplinary Areas of Excellence. It is also important to emphasize that SOPPS research core facilities, especially the mass spectrometry facility, are not only serving faculty members within the Department of Pharmaceutical Sciences, but also investigators from other Departments across campus (e.g. Biomedical Engineering, Biology and Anthropology departments), investigators in New York State and beyond. In terms of community services, faculty members from our Department have established partnerships with private companies and universities regionally and nationally to combat skin cancer, tick borne diseases and other infectious diseases. Today we have established one of the largest sites to recruit patients for biomarker studies in Lyme disease and muscular

support the new MS and PhD programs. No additional expenses will be required for the teaching and mentoring efforts of the SOPPS faculty. As noted above, faculty (two tenure-track faculty, TBH1 and TBH2) in this application will be hired on faculty lines that are already approved and allocated to the Department for the existing PharmD program.

2019		members
Spring 2020	Internal review of the proposal (Completed)	Graduate School, curriculum

existing faculty from the Department of Health Outcome & Administrative Sciences will also assist in administering the proposed programs and will provide expertise in the field of bioinformatics and biostatistics. As existing faculty members are experts with areas of specialization appropriate to cover all areas of research and educational skills needed for the MS and PhD programs, we are well-positioned to start the program immediately upon receiving SUNY approval. In addition to its existing faculty members, the Department of Pharmaceutical Sciences has one full-time and one half-time dedicated laboratory technicians who will assist with practical courses. One full time IT staff member is already well-integrated in and supported by the School. He assists lab personnel and faculty with computer, internet; institutional software, database and data storage capabilities; and will provide these services at no additional cost to MS and PhD program operations. Furthermore, one librarian is dedicated to the School on a part-time basis for the PharmD program. She will also support the MS and PhD programs within her current effort at the School. **The only personnel resources as expenditures to the new program are one graduate administrative assistant and one teaching assistant will be hired to assist with the programs.**

Faculty members of the Department of Pharmaceutical Sciences are diverse, representing four continents (North America, Europe, Africa and Asia). Two of our new faculty members are underrepresented minorities (African American and Hispanic). The Department of Pharmaceutical Sciences was recently awarded a Presidential Diversity Fellowship at Binghamton University to recruit a native Nigerian, who currently contributes to Departmental teaching and research. About half of our faculty members are women. Recruiting more qualified women and minority faculty is essential for continued growth and creativity in our academic

Additional support for the PhD program will come from external funding and future training grants.

New net revenue and expenses presented in the Table below are specifically for the MS Program. These include a budget to support a Teaching Assistant, a

Design *that provides as much detail as possible about the program or facility.*

The MS and PhD programs in Pharmaceutical Sciences are designed to educate and train students in the use, development, and implementation of emerging technologies to advance research in the fields of pharmaceutical and biomedical sciences. More specifically, the program will educate the next generation of scientists to be well-versed in emerging areas of drug target discovery, drug testing and drug delivery, and will prepare graduates for careers in a variety of scientific fields and healthcare leadership positions. The MS program is focused on foundational and technical knowledge to prepare students with work force-ready skills and the PhD program will prepare students to become competent scientists to conduct innovative and impactful rigorous research in the fields of pharmaceutical and biomedical sciences in industry, academic, private or federal agencies.

The PhD curriculum will require a minimum of 67 credits with the following breakdown:

- Core classes (credits; year to be taken): Cellular and Molecular Basis of Human Disease (4; year 1); Biostatistics (3; year 1); Pharmaceutical Sciences I and II (4 each; year 1); Lab rotations (3 each; year 1); Student seminar (1 per semester; all years); Critical Thinking and Communication (4; year 2); Research/Dissertation design (varied; year 2-completion).
- An additional required 9 credits will be tailored to the needs and research areas of each doctoral student through three electives (3 credits each) to be taken in the second year. Options for this class include, but are not limited to, doctoral level chemistry, biomedical engineering, pharmaceutical sciences, or pharmacy classes.
- The remainder credits are for research dissertation and participation in seminars.

The MS curriculum will require a minimum of 33 credits with the following breakdown:

- Core classes (credits; year to be taken): Cellular and Molecular Basis of Human Disease (4; year 1); Biostatistics (3; year 1); Pharmaceutical sciences I and II (4 each; year 1); Analytical Methods and Instrumentation I and II (3 each; year 1); Student seminar (1 per semester; all years). Note, a student may petition the departmental graduate committee to accept PHRM 698 Lab rotations (up to 6 credits), in place of the Analytical Methods and Instrumentation I and II coursework requirement.
- The remainder of the credits required (~9) will be tailored to the needs and goals of each

  from 9 credit hours of electives. Electives must be taken from 500+ level options from biology, chemistry, biomedical engineering, pharmaceutical sciences, or pharmacy classes. Note, PHRM 699 Mentored Research (up to 6 credits) may be accepted in place of the MS research project/industry rotation to meet MS degree requirements.

By the end of the program, successful graduates will:

Be skilled in emerging areas of drug target discovery and drug development, especially in studies related to pre-clinical pharmacology, clinical trials, biomarker development, pharmacogenomics, medicinal chemistry and pharmaceutics.